Granville Solvents
Comments on Removal Action Completion Draft Final Report (July 30, 2010)

The U.S. Environmental Protection Agency (EPA) has reviewed the Removal Action Completion Draft Final Report of July 30, 2010 (the "Report") for the Granville Solvents Site (the "Site") submitted by the Granville Solvents Site Response Management Group (the "Group"). The Report was required under the September 7, 1994 Administrative Order on Consent (AOC) between the Group and EPA to perform Removal Actions to protect the Village of Granville drinking water supply; to reduce the concentration of contaminants in groundwater to or below Applicable or Relevant and Appropriate Requirements; and, to reduce the concentration of contaminants in Site soils to no further action levels.

EPA is submitting the following comments on the Report. The comments are overarching in nature and represent our substantive concerns; hence, page-specific corrections are generally not included at this time.

1. The AOC required that monitoring be performed for five years after the groundwater pump-and-treat system was turned off. The system was turned off in March 2005, yet the monitoring appears to have been discontinued in September 2009 and may have omitted six months of data.

2. Page 4 of the February 2010 report (2009 Annual Groundwater Monitoring Report) stated that the proximity of the Site to the northern margin of the buried valley and the geometry of the overall valley narrowing adjacent to the Site supports a slight groundwater divide between the Site and the Granville well field, and further, that in the absence of local pumping, the regional gradient would be from west to east with contributing recharge from the bedrock into the valley.

   However, due to the lack of data for the deeper wells, it has not been demonstrated that groundwater at deeper levels also flows west to east. A letter of September 29, 1994 from EPA to Doug Plunkett, which addressed public comments from the Proposed Plan, stated that the saturated aquifer thickness and depth is not precisely known below the Site and the Granville well field. It is at least 100 feet deep from the surface of the soil and may extend to 150 feet below the Granville well field. The water table is generally ten feet below ground surface (bgs), and extends to over 100 feet deep based on locations of pumping wells. The monitoring wells installed for Site investigations range between about 20 and 60 feet bgs. The Granville water supply wells range between 95 and 106 feet bgs.

   It is unknown whether the monitoring wells screened in the top of the aquifer are a good indicator of what is occurring in the deeper aquifer. There do not appear to be many wells in the deep aquifer representative of the Granville water supply wells that were monitored since 2005. The wells identified as deep wells (i.e., MW-04D and MW-02D) are about 48 feet at the deepest. The deepest well that is monitored regularly (annually), according to page 11 of the Report, is GSS-EW 1, which is screened at 78 feet bgs. In

any case, the shallower compliance wells were identified as the determinant for groundwater remedial action objectives.

3. The potentiometric surface depicted in most of the maps in the Report does not appear to be an accurate predictor of the true direction of groundwater flow. The potentiometric surface depicted in the maps is typically more complex than would be expected of a natural system in which water levels would vary through space in a more or less consistent manner. Among the complexities at this Site, water levels at well GSSMW-05 may be anomalously low given the high surface elevation here and the high water level in nearby well GSSMW-06. Conversely, water levels at GSSMW-06 may be anomalously high, perhaps because this well appears to be screened in a deep clay unit rather than the sand and gravel aquifer monitored by most of the wells. These complexities indicate that the depiction of the potentiometric surface is probably not accurate.

   Since the monitoring wells are relatively old, several tasks should be performed to ensure the accuracy of the water-level data. These include re-surveying the monitoring wells and measuring the wells for total depth to detect if they are filling in.

   In addition, EPA questions whether the "groundwater divide" depicted between the Site and the Granville wells in a number of documents actually exists. There is no obvious reason for the divide to be there as it does not correspond to a topographic high. Such a divide could be due to the effects of pumping from the Granville wells, however, if this were the case, the location of the divide would be expected to vary through time as the effects of pumping on the aquifer increased and decreased. This does not appear to be the case.

   If the divide is actually present due to the effects of pumping from the municipal wells, then this interpretation requires that groundwater (and contaminants in groundwater) west of the divide flow toward the municipal wells. This area of flow toward the municipal wells includes contaminated wells GSSMW-15 and MW-08. This interpretation means there is a threat to the water quality in the municipal wells which must be addressed. The presence of the divide is always based on the high water level in GSSMW-15. However, well GSSMW-15 is partly open to the shallow silt and clay unit, which may result in its water level being higher than the true water level in the sand and gravel aquifer in this area. The presence of (and recent increase in GSSMW-15) contamination in wells GSSMW-15 and MW-08, located on, or at the other side of, the groundwater divide from the Site also demonstrates that the groundwater divide is not actually present in the sand and gravel aquifer.

   Further, questions regarding the assessment of the groundwater flow directions determined from the water level measurements (including the presence of the groundwater divide) is demonstrated by the distribution of contaminants in the aquifer, which are a better indicator of flow direction than water levels. The distribution of volatile organic chemicals (VOCs) in the aquifer (and the pattern of the recent trends in VOC concentrations) shows that the VOCs have moved from east to west and continue to do so. This flow direction is contrary to the generally north-south flow direction that is

indicated by the post-remediation water levels. If the potentiometric surface depicted in the Group's 2009 and 2010 annual reports is accurate, then the distribution of contamination in the aquifer (e.g., the presence and stable concentrations of VOCs in well MW-06) cannot be readily explained.

4. Page 11 of the Report states that VOC concentration trends are generally stable or declining with the exception of VOC increases in wells GSSMW-15, MW-2D, and MW-8, which suggest a potential western shift of the plume. However, VOCs have generally been increasing in these wells since the May 2005 shutdown of the groundwater pump-and-treat system. Several of the figures illustrate that it is only a matter of time before the contaminants of greatest concern [e.g., trichloroethylene (TCE) and tetrachloroethylene (PCE)] reach the compliance wells. The following figures illustrate this:

    - Appendix H, Fig 5A: The September 2009 data show PCE concentration (25 ppb) is five times the Maximum Contaminant level (MCL) of five ppb in GSSMW-15.

    - Section 3, Figure 5-5: The graph clearly shows that all contaminants, except for TCE are increasing in GSSMW-15 since the 2008 sampling events.

    - Figure 5.4: In source area MW-02D, all other contaminants except PCE and trans-1,2-dichloroethylene (trans-1,2-DCE) are increasing. PCE has shown a general increasing trend until August 2008, but has remained the same in 2009.

    - Fig 5.1: In source area MW-04D, all contaminants are increasing except trans-1, 2-DCE.

    - Figure 5.7: In MW-08 (leading well), there is an increasing trend in contaminant concentrations for two of the five parameters (i.e., cis- and trans-1,2-DCE).

As mentioned, VOC concentrations at MW-02D have been increasing overall since 2004. The concentrations of several VOCs also have been increasing since 2005 in well GSSMW-15. In addition, a fair amount of DCE is present at MW-08 at generally stable concentrations.

Because the depth of the plume is unknown at the leading edge wells, the recent detection of low concentrations of TCE at well GSSMW-09 warrants further investigation of the contamination with depth in this area. The GSSMW-09 may intercept the plume here, but at present there is no way to determine if it intercepts the heart of the plume, particularly when the elevation of the screens for the municipal supply wells appears to be below the elevation of most of the monitoring wells that are subject to periodic sampling.

Page 13, Section 7 (Conclusions)

5. Ultimately, the potentiometric surface (at least on occasion), the location of the VOC plume, and the location of the wells where the VOC concentrations are increasing indicate a long-term potential for the groundwater plume from the Site to impact the municipal wells. It does not appear that any of the municipal wells actually have been impacted since the pump-and-treat system shutdown. The Granville municipal supply wells may not be impacted in the future as long as there are not substantial increases in pumping from the remaining municipal supply wells.

   The fact that the plume does not appear to move in the direction of regional groundwater flow, but instead defines a fairly straight line between the source area and the municipal supply wells, strongly indicates that the plume was, and is, migrating under the influence of the pumping from these wells. This interpretation is further supported by the fact that some of these east-west oriented wells are still showing an increase in VOC concentrations, whereas wells in the remainder of the plume are maintaining stable concentrations.

   Of further concern is that the hydrogeology and geochemistry do not appear to favor substantial natural attenuation of the VOC plume for the following reasons: The shallow clay likely prevents much precipitation from entering the aquifer to dilute the plume; there is likely to be minimal organic carbon on which to absorb the VOCs as the plume moves through the aquifer; and biodegradation appears to be nominal. This conclusion is supported by the fact that none of the wells have shown an actual decrease in VOC concentrations in the years since the active remediation was terminated and a few wells have shown increases in concentration.

Page 14 (Recommendations)

6. VOC trend data indicate the persistence and increase in strength of a plume upgradient of the leading edge wells, and the PCE and TCE concentrations in GSSMW-15 (the nearest well to the leading edge wells) are (depending on the constituent) frequently more than twice the MCL.

   Several measures should be undertaken to better define the plume and the potential for pumping to impact plume movement. The following actions should be completed regardless of the status of the pump-and-treat system.

   a. Perform vertical aquifer sampling from the top to the bottom of the aquifer at a location halfway between the MW07 and MW08 clusters. This information should provide a comprehensive assessment of the presence of the plume in this area and whether or not the current well network monitors the appropriate aquifer depths.
   b. Collect groundwater levels on a 20-minute frequency in several monitoring wells and determine if trends in water levels can be attributed to the start or termination of pumping in the municipal wells, and which wells it can be related to.
   c. Collect a sample from EW-1.

d. Continue annual monitoring for a minimum of two years, and until it is determined that monitoring is no longer necessary.

The comprehensive data presented in the Report show a general upward trend in contaminant concentrations, indicating that the AOC requirements have not been completed. Though the Granville municipal wells are in no immediate danger of contamination at this time, more data is needed to track the contaminant trends. Accordingly, EPA does not approve of dismantling and/or removing the groundwater pump-and-treat system and monitoring wells at this time. Should the plume reach triggering levels in the leading edge wells after the pump-and-treat system is dismantled and/or removed, a replacement system would be required under the AOC.

As mentioned in the cover letter to this attachment, EPA is amenable to meeting with the Group to discuss these comments further.